IN THE SPECIFICATION:

At page 1, prior to line 1, please insert new headings and text as follows:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is the U.S. National Stage of International Application PCT/FI03/00222 filed March 23, 2003, published in the English language on October 2, 2003 with international Search Report under International Publication Number WO 03/081882 A1 and claiming priority from Finnish Patent Application No. 20020570 filed March 25, 2002.

BACKGROUND OF THE INVENTION

1. Technical Field

At page 1, prior to line 5 please insert the following heading and amend the paragraphs beginning on line 5 through 22 as follows:

2. Discussion of Related Art

One current concern is the power consumption of the mobile terminals, which with new features related to mobile Internet and ~~3G~~third generation technology require more power. Other issues to consider are the network capacity, cost and QoS (Quality of Service) demands which vary depending on time and the nature of the required service.

There are a few known solutions relating to the flexible downloading of data or ~~retreaving~~retrieving and sending e.g. electronic mail by a mobile terminal. US Patents 5 896 566 and 5 689 825 disclose the use of a battery charger module with built-in connection to a PLMN (Public Land Mobile Network) network. The availability of a software update is detected by the mobile terminal, and the update is downloaded via the charger using the quality and speed of a fixed line network, when the terminal is placed in the charger. However, this solution is due to the rather costly

and complicated dual connection viable only where the bandwidth over the air interface available is narrow, making the transfer of large data files slow, and when the signal quality is low resulting in high error rates.

The Nokia 9110i (trademarks of Nokia Corporation) handset, which is a handset with email and other data communication facilities, has ~~an in-built~~built-in feature for timed fetching of mails or information from the Internet, like webpages. However, no powersaving or cost-saving considerations are made.

On page 2, prior to line 1 please insert the following heading and amend the paragraph beginning on line 1 as follows:

DISCLOSURE OF THE INVENTION

In order to overcome the problems mentioned above, the present invention discloses a method, a device and a process for distributing various tasks performed by a mobile terminal over time, with the idea to minimize the need for battery power of mobile terminals in performing certain tasks and functions. A basic assumption in this context is, that as the complexity of the mobile terminals increases it is apparent that there will be several power consuming operations wherein the exact time of execution is not very critical. It is also possible to identify the tasks which are, for some reason or another, to be performed by advanced mobile terminals more ~~favourably~~favorably at some time later on instead of instantly.

On page 5, please amend the paragraph beginning on line 8 as follows:

In a further aspect of the invention, a process for delayed execution of tasks in a mobile wireless communications terminal capable of wireless speech and data communication over an air interface, said terminal including processing means for processing tasks and timing means for performing timed execution of said tasks, said terminal including memory means for storing instructions and data associated with each such task, is characterized in that said process comprises the steps wherein

- said mobile terminal receives at least one instruction to perform a task,
- said terminal identifies the task as a delayable background task,
- said terminal stores the data related to the execution of delayable task in a queue located in the memory,

- said terminal executes said task using the processing means of said terminal upon ~~recognising~~recognizing a connection between the battery of said terminal and the power source of a charging device.

On page 6, prior to line 26, please insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

On page 7, prior to line 1, please insert the following heading:

BEST MODE FOR CARRYING OUT THE INVENTION

On page 7, please amend the paragraphs beginning on line 12 through page 9, line 23 as follows:

In this first embodiment of the invention, the charging device (102) does not differ from the devices already on the market; the only function it has is to recharge the batteries of the mobile terminal (101). The features of this embodiment will be explained in more detail below, including embodiments incorporating learning and ~~utilising~~utilizing the charging ~~behaviour~~behavior of the user.

The mobile terminal (101) is equipped, among other things, with music playback functionality, and the user has ordered a music data file to be delivered to the mobile terminal (101) via the Internet. The music file format can, for example, be the popular MP3 format, or any other format the mobile terminal is capable ~~to handle~~of handling. The amount of power required for receiving an MP3 music file is quite high. As approximately 1 MB of data is required for each minute of music, the user of the mobile terminal (101) is, according to the present invention, inclined to download the music while the terminal (101) is being connected to a battery charger (102), in order to ~~optimise~~optimize the processing of power consuming background operations. Also, as the user has no time or desire to listen to this particular piece of music immediately, he has ordered the file to be delievered to the mobile terminal (101), say within the next 24 hours. This deferred downloading is referred to as background downloading.

According to the flowchart of figure 3, the inventive process is initiated by the user who issues an audio file download order (301). The mobile terminal (101) checks whether immediate or background downloading is requested by the user (302). Let us assume that the user has a default maximum time for the background download of 24 hours. In this case no specific time is given, and the terminal (101) identifies the command as a default background download command, and assumes normal operation while pushing the download task in its command stack or similar queue of tasks located in the memory (201) to be performed later on (303) by the processing unit (203), when the terminal (101) is connected to a battery charger (102). Additionally, if the user tends to abort the charging phase before completion due to his irregular lifestyle etc., it may be advantageous to defer the task execution until the battery (102) is fully charged. Anyway, the operations can be taken from the queue by following e.g. first-in-first-out (FIFO) principle, or by a predetermined priority. Stacking commands and operands are within the normal skills of any system programmer, so this function as such ~~needs~~need not ~~to~~ be explained in more detail.

According to the flowchart of figure 4, in the second embodiment of the present invention, the mobile terminal (101) has analyzed the battery charging routines of the user and calculated ~~favourable~~favorable time intervals to execute background tasks (401). During those intervals the terminal (101) is most probably being connected to a charger (102). After receiving instructions to perform a task without specified execution time (402), the terminal (101) defers the task execution until the calculated time interval is entered (403). Typically, tasks like this involve downloading and prefetching (precaching) of content such as Internet pages, music, games, photographs, and the mobile terminal (101) requests the service ~~(or~~(or a separate content delivery system) to send e.g. an MP3 music file between 1-6 a.m., since during this time said terminal (101) is usually connected to a charger (102) and the battery (205) is full. When the user wants to have the music file ready in the morning, the downloading is performed before the specified time limit. Other types of tasks involving merely internal calculation (see below) may in these cases be less ~~prioritised~~prioritized, and execution of them is postponed until all ~~data transfer requiring~~ tasks requiring data transfer have been executed.

In such an embodiment, based on user ~~behaviour~~behavior monitoring and if any additional decision rules are not considered, the delayable task may be performed during the calculated time interval whether the mobile terminal (101) is connected to the charging device (102) or not, thus running the risk of consuming extra battery

power every now and then. However, as the device learns the ~~behaviour~~behavior of the user, and the user learns to know the details of this feature, the occurrence of these cases where downloading or background processing is made without power backup from the charger may in ~~practise~~practice be rare, without any consequences in power failures.

In the third embodiment of the present invention, see the flowchart of figure 5, the terminal (101) also exploits the calculated time intervals (501) for determining the proper execution time of delayable tasks (502). In addition, the terminal (101) may decide to wait during said calculated time interval (503) until said terminal actually is connected (504) to a charging device (102), and extending this waiting time until the end of the time delay available, or until the level of battery power available is approaching a limit putting the full execution of the queued tasks at risk. There may be more options how to handle those situations, of course, some of which may be user-determined, e.g. by issuing a task priority list (505). For example, if the terminal (101) is coupled to a charger (102) in late evening, a fair assumption would be that it will stay there for the rest of the night. In a simple implementation, the terminal (101) sends the request for delivery immediately, or when the battery (205) is fully charged. In another implementation, the terminal (101) may wait till the expected traffic conditions and data transfer costs are optimal, e.g. until midnight. To be able to ~~optimise~~optimize the utilization of ~~favourable~~favorable traffic conditions and data transfer costs, the terminal (101) may have to communicate with the service provider and network carrier. By using slower connection speeds or channels than would be possible at instant downloading and listening, in a period of quiet traffic, normal daytime services can be achieved at significantly lower costs. There are tasks requiring lots of calculation but little or no data transfer over the air interface. Such tasks are, for example, calculation of user profiles and preferences related to compression of files to save memory or disk space/flash memory; and organization of stored files to prevent fragmentation of files which in turn saves power and speeds up the terminal. In such cases, the benefits are mostly due to the power saving aspect of the invention, requiring the terminal (101) actually being coupled to the charger (102).

On page 10, please amend the paragraph beginning on line 20 as follows:

Implementations of some of aforesaid embodiments require a data connection (206,208) between the mobile terminal (101) and the charging device (102), and an appropriate protocol and software to control the process. Today's mobile terminals are, however, increasingly well equipped with standardized platforms to handle data exchange with other devices, such as personal computers, sensors, pointing devices etc. Such platforms include wireless infrared- and LPRF (e.g. Bluetooth) based Personal Area Network (PAN) solutions, and wired connections to computers, FM radios, external keyboards and the like. It is thus for one skilled in the art not difficult to implement a suitable data transfer solution between a charging device (102) and a mobile terminal (101), as most new mobile terminal models already have a suitable capability ~~in-built~~built-in.